SUMMARY - TASKS

Task		Object / Vehicle	Equipment	Time	Maximum score
A	Tire change	VW Golf 1,4 TSI, 2009	Boxer A22-20 GT Tire Changer, Balancing Machine Hofmann Geodyna 6300P, Digital Torque Wrench	45 min.	25,50 = 100 %
B	Brakes	Toyota Auris 2,2 D-4D, 2008	Vernier caliper, magnetic base with dial gauge, micrometer, torque wrench	60 min.	29,50 = 100 %
C	Engine - diagnosis	Toyota RAV4 2,0, 3ZR-FAE, 2010	Bosch KTS 590, Mekonomen CDP+ Intelligent tester II Toyota (Student may bring their own tester.)	45 min.	29,00 = 100%
D	Electrical - Multimeter	Toyota Corolla 1,4 D-4D, 2006	Multimeter (Student may bring their own.)	30 min.	31,50 = 100 %
E	Engine – Timing belt	Ford Focus 1,6, 1999, FYDA/C, engine at a stand	Special tools, Workshop instruction (Autodata)	60 min.	30,00 = 100 %
Total				**240 min.**	**145,50 = 500 %**

Description of tasks:

A. You will change a tire on one wheel (examiner will tell you which). The task includes everything from the time you place the car on the lift until you take it off, including balancing. Written documentation of the task on a work order.

B. You will disassemble brake pads and brake calipers in the front and make a mechanical measurement of brake components in the front, included brake discs. Written documentation on the work order.

C. Check engine light is on, you have to read out fault codes and determine which component(s) the problem relates to and use available documents to find and repair the problem.

D. Measure voltage drop, resistance and electrical current usage on specified components according to a form.

E. You will replace the timing belt on an engine that is in an engine stand.

When the task is on a vehicle, this means that the customer has dropped the vehicle off in that place and it will be picked up from the same place. You should make the vehicle completely ready so that the customer can pick it up from the same place.
Each task counts for a percent of the total score. If a participant satisfies all the assessment criteria, it is possible to achieve a total of 500% across the five tasks. Participants will be ranked according to the percentage they achieve.

Personal protection: Work clothes, work shoes with steel toe, work gloves, safety glasses and hearing protection.

TASK A: TIRE CHANGE

Vehicle/ Component	Volkswagen Golf 1,4 TSI, 2009
VIN:	WVWZZZ1KZ9W015949

Task Length	45 min

Task section / distribution of points		Maximum score
A1	Health, safety, environment and labor structure	3,50
A2	Lifting car, removal of wheel	1,00
A3	Replacement tire	9,00
A4	Balancing	4,50
A5	Mounting wheel on car, removing car from lift	3,00
A6	Documentation	4,50
	Task Total	25,50

Task descriptions:

1. You shall change a tire on one wheel (examiner will tell you which). The task includes everything from the time you place the car on the lift until you take it off, including balancing.
2. Written documentation of the task in English on a work order.

NB! The vehicle was left where it is and should be ready for him/her to pick up at the same place.

TASK A:
TIRE CHANGE – CRITERIA *STUDENT:*

Groupe ID	Assessment Criteria	Max Points	Achieved Points
A1	**Health, safety, environment and labor structure**	**3,50**	
	Approved work clothes and shoes. (no loose ends)	**Must wear!**	
	Used seat covers before working.	0,50	
	Used correct lifting points.	0,50	
	Use of personal protective equipment. (hearing-, eye-, and hand protection)	1,50	
	No damage on car or equipment.	0,50	
	Work structure and system.	0,50	
A2	**Lifting of car, removal of wheels**	**1,00**	
	Removal of wheel with proper equipment.	0,50	
	System for removal of wheel nuts/bolts and covers.	0,50	
A3	**Tire change**	**9,00**	
	Inspected and cleaned the wheel if necessary.	0,50	
	Removal of old wheel weights.	0,50	
	Let air out of wheel.	0,50	
	Clamp loose the tire on both sides.	0,50	
	Mounted rim properly in the tire changer without scratching the rim.	0,50	
	Adjust the tire changer´s arm to the rim.	0,50	
	Remove tire from rim.	0,50	
	Checked tire and rim for damage.	1,00	
	Checked valve stem, if necessary change valve.	0,50	
	Lubricated rim and new tire.	0,50	
	Mounted new tire according to the wheel rotation direction / outside / inside	1,00	
	Mounted tire on rim by pressing down on the side of the tire to ease installation.	0,50	
	Inflated tire pressure.	0,50	
	Installed valve needle.	0,50	
	Checked and adjusted for correct inflation pressure.	0,50	
	Mounted dust cap.	0,50	

Examiner

A4	**Wheel balancing**	**4,50**	
	Mounted wheel on balancing machine.	0,50	
	Input the wheel parameter.	1,00	
	Press the start button and check for imbalance.	0,50	
	Positioned the weights on the wheel.	1,00	
	Rechecked for imbalance.	1,00	
	Removal of wheel.	0,50	
A5	**Mount wheel on car and remove car from lift**	**3**	
	Mounted wheel on car, finger tight wheel bolts.	0,50	
	Cross-pattern tightening of nuts with low torque.	0,50	
	Cross-pattern tightening of nuts with torque wrench and to the specified torque.	1,00	
	Mounted covers for wheel bolts.	0,50	
	Lowered car from lift and remove seat covers.	0,50	
A6	**Documentation**	**4,50**	
	Use of documentation (instructions)	1,00	
	Stamped work order with initials or name	0,50	
	Written down odometer reading	1,00	
	Mechanics report in english listing what was done and if anything else has to be done.	1,00	
	Set equipment and workspace back in proper place and condition	1,00	
	Remember to turn off balancing machine!	0,00	
	Task Total:	**25,50 (100%)**	

TASK B: BRAKES

Car/ Component	Toyota Auris 2,2 D-4D, 2008
VIN:	SB1KB56E90F002818

Task length	60 min

Task sections / distribution of points		Maximum score
B1	Health, safety, environment, and labor structure	5,00
B2	Removal of components	3,00
B3	Controls and measurements	7,50
B4	Installing components	8,50
B5	Documentation and preparing for next participant	5,50
	Task Total	29,50 (100%)

Task description:

1. Disassemble brake pads from front brakes both sides.
   Measure the brake disc runout with dial gauge, both sides in front of vehicle.
   Measure the brake disc thickness with use of a micrometer.
   Measure brake pad lining thickness with use of a vernier caliper.
   Install the components with use of proper torque and with use of thread locker on bolts for the brake parts.
   Check brake pedal traveling and check for a firm brake pedal.
2. Written documentation in English on a form and the work order.

NB! The vehicle was left where it is and should be ready for him/her to pick up at the same place.

TASK B:
BRAKES – CRITERIA

STUDENT:

Groupe ID	Assessment Criteria	Max Points	Achieved Points
B1	**Health, safety, environment and labor structure**	**5,00**	
	Approved work clothes and shoes. (no loose ends)	**Must wear!**	
	Used seat covers before working.	0,50	
	Use of personal protective equipment. (hearing-, eye-, and hand protection)	1,50	
	Used correct lifting points.	1,00	
	No damage on car or equipment.	0,50	
	Work structure and system.	1,50	
B2	**Disassembly of Components**	**3,00**	
	Disassembled front-wheels.	0,50	
	Disassembled front brake calipers.	1,50	
	Disassembled brake pads.	1,00	
B3	**Brake measurements**	**7,50**	
	Calibrated micrometer before measurements.	1,00	
	Measured brake disc thickness with micrometer.	1,50	
	Tightened disc with wheel nuts or bolts before measurement of runout.	1,50	
	Measured the runout of the discs with a dial gauge.	1,00	
	Measured thickness of brake pads with a vernier caliper.	1,50	
	Written down specification for minimum thickness of brake pad	0,50	
	Written down specification for minimum thickness of brake disc	0,50	
B4	**Assembly of components**	**8,50**	
	Mounted front calipers and brake pads.	1,50	
	Installed brake calipers with specified torque.	1,00	
	Used thread locker when mounting calipers.	1,00	
	Mount wheels on car, finger tight wheel bolts.	0,50	
	Cross-pattern tightening of nuts with low torque.	1,00	
	Cross-pattern tightening of nuts with torque wrench and correct torque.	1,00	
	Mounted covers for wheel bolts.	0,50	

Examiner

	Lowered car from lift and remove seat covers.	0,50	
	Checked brake pedal traveling and checked for a firm brake pedal.	1,50	

B5	**Documentation**	**5,50**	
	Use of documentation (instructions).	0,50	
	Stamped work order with initials or name	1,00	
	Written down odometer reading.	1,00	
	Mechanics report in English listing what was done and if anything else has to be done.	1,50	
	Set equipment and workspace back in proper place and condition.	1,00	
	Removed plastic seat cover.	0,50	
Total		29,50 (100%)	

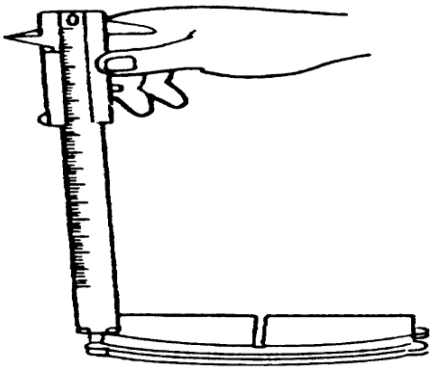
BRAKES – FORM

STUDENT:

Measured runout brake disc **left** side:	
Measured runout brake disc **right** side:	
Conclusion **left** side:	
Conclusion **right** side:	

Measured brake disc thickness **left** with micrometer:	
Measured brake disc thickness **right** with micrometer:	
Specification:	
Conclusion **left** side:	
Conclusion **right** side:	

Measured brake pads thickness **left** side:	Inside:	Outside:
Measured brake pads thickness **right** side:	Inside:	Outside:
Specification:		
Conclusion **left** side:		
Conclusion **right** side:		



TASK C: ENGINE - DIAGNOSIS

Car/ component	**Toyota Rav4 2.0 Valvematic, 2010,** **engine code: 3ZR-FAE**
License plate / VIN:	**KH68268 / JTMBE31V20D009085**

Task length	**45 min**

Task sections / distribution of points		**Maximum score**
C1	**Health, safety, environment, and labor structure**	**5,50**
C2	**Use of documentation**	**5,00**
C3	**Diagnosis, measurements and repairing**	**11,50**
C4	**Documentation**	**7,00**
	Task Total	**29,00 (100%)**

Task description:

1. **"Check engine" light is on. The engine apparently runs ok, the customer complains of some higher fuel consumption than before. There may be fault codes. Check DTC, make use of documentation for wiring diagrams, component location, pin data, DTC, table for fuses and relays and so on. Find and repair the fault if possible with use of available equipment and tools. In cases where spare parts are needed ask your examiner for the parts you need. If it is not possible to repair now, then describe in English on a work order what to do next.**
2. **Written documentation in English on the work order.**

TASK C:
ENGINE – DIAGNOSIS – CRITERIA *STUDENT:*

Groupe ID	Assessment Criteria	Max Points	Achieved Points
C1	**Health, safety, environment, and labor structure**	**5,50**	
	Approved work clothes and shoes. (no loose ends)	**Must wear!**	
	Used seat covers before working	0,50	
	Use of mudguard protector	1,00	
	Use of personal protective equipment. (hearing-, eye-, and hand protection)	1,50	
	Put on and switched on exhaust fan	1,00	
	No damage on object or equipment	0,50	
	Work structure and system	1,00	
C2	**Use of documentation**	**5,00**	
	Found the proper vehicle in computer systems	1,00	
	Found the corresponding wiring diagram	1,00	
	Found the corresponding component location chart	1,00	
	Found the corresponding DTC table	1,00	
	Found the corresponding PIN data where needed	1,00	
C3	**Diagnosis and repairing**	**11,50**	
	Localized OBD contact	1,00	
	Diagnosis with use of tester	1,00	
	Reading fault codes	2,00	
	Reasonable use of electrical diagram	1,00	
	Found problem area or component	1,00	
	Repaired fault with use of necessary equipment.	1,00	
	Diagnosis after fault is repaired	0,50	
	Deleting of fault codes	1,00	
	End diagnosis as a control	2,00	
	Assemble parts and connectors	1,00	
C4	**Documentation and end control**	**7,00**	
	Wrote down faults and fault codes	1,50	
	Conclusion diagnosis and measurements	1,50	
	Use of documentation (instructions)	0,50	
	Stamped work order with initials or name	0,50	
	Written down odometer reading	1,00	
	Mechanics report listing what you have done and if anything else has to be done.	1,00	
	Set equipment and workspace back in proper condition	0,50	
	Removed plastic seat cover	0,50	
	Task Total	**29.00 (100%)**	

Examiner

TASK D: CAR ELECTRICAL SYSTEM- MULTIMETER

Car/ Component	Toyota Corolla 1,4 D-4D, 2006
VIN:	

Task Length	30 min

Task sections / Distribution of points		Maximum score
D1	Health, safety, environment, and labor structure	7,00
D2	Completion of measurements	13,50
D3	Documentation, assess measurement values and possible problems	11,00
	Task Total	31,50 (100%)

Task description:

1. You will measure the drop in voltage on the headlight high beam, the total on each side as well as divided up for insulated and uninsulated circuits.
2. Measure the resistance of the designated components.
3. Measure power consumption when the engine and ignition key is off, this in order to determine if there is too much which is discharging the battery when the car is parked. NB! Key should not be in the ignition.
4. Written documentation in English at the work order and a special form.

NB! The vehicle was left where it is and should be ready for him/her to pick up at the same place.

TASK D: CAR ELECTRICAL SYSTEM – MULTIMETER - CRITERIA

Groupe ID	Assessment Criteria	Max Points	Achieved Points
D1	**Health, safety, environment, and labor structure**	**7,00**	
	Approved work clothes and shoes. (no loose ends)	**Must wear!**	
	Use of seat cover.	1,00	
	Use of mudguard protector	1,00	
	Use of personal protective equipment. (hearing-, eye-, and hand protection)	1,50	
	Put on and switched on exhaust fan	1,00	
	Considered danger of a battery short circuit.	1,00	
	No damage to model and equipment.	1,00	
	Labor structure and system.	0,50	
D2	**Completion of measurements**	**13,50**	
Voltage	Key on and engine running	1,00	
	Proper set up of Multimeter	0,50	
	Measured correctly battery voltage with high beam turned on and got the approximately correct result.	0,50	
	Measured correctly voltage on high beam bulb left and got the approximately correct result.	0,50	
	Measured correctly voltage on high beam bulb right and got the approximately correct result.	0,50	
	Measured correctly voltage drop for high beam – left insulated circuit and got the approximately correct result.	1,00	
	Measured correctly voltage drop for high beam – left uninsulated circuit and got the approximately correct result.	1,00	
	Measured correctly voltage drop for high beam – right insulated circuit and got the approximately correct result.	1,00	
	Measured correctly voltage drop for high beam – right uninsulated circuit and got the approximately correct result.	1,00	
Resistance	Proper set up of Multimeter.	0,50	
	Measured correctly resistance on item A with the right result.	1,00	
	Measured correctly resistance on item B with the right result.	1,00	
Current	Disconnected negative terminal on battery.	1,00	
	Proper set up of Multimeter.	0,50	

	Measured correctly power consumption with ignition turned off using Multimeter as an Ampere meter and got the approximately correct result.	1,50	
	Key not in ignition switch	0,50	
	Assemble parts if disconnected or disassembled.	0,50	
D3	**Documentation, assessment of values and correction of problems**	**11,00**	
	Correctly calculated total voltage drop	1,00	
	Wrote the correct result with the correct name for all voltage measurements.	1,00	
	Wrote the correct result with the correct name for all electrical resistance measurements.	1,00	
	Wrote the correct result with the correct name for all electrical current measurements.	1,00	
	Correctly assessed and conclusion of voltage values.	1,00	
	Correctly assessed and conclusion of electrical resistance values.	1,00	
	Correctly assessed and conclusion of electrical current values.	1,00	
	Put equipment and workspace back in proper place and condition.	0,50	
	Removed plastic seat cover.	0,50	
	Stamped work order with initials or name	1,00	
	Mechanics report listing what was done.	1,50	
	Odometer reading	0,50	
	Task Total:	**31,50 (100%)**	

Form - Car Electrical System - Multimeter

VOLTAGE

Battery voltage, loaded circuit		
Voltage on left side bulb -		[redacted]
Voltage on right side bulb -	[redacted]	
Total voltage drop =		

	Left side	Right side
Voltage drop in **insulated** part of circuit (positive side +)		
Voltage drop in **uninsulated** part of circuit (negative side -)		

Conclusion:

Resistance (Electrical resistance)

Measured resistance:	A:	B:

Conclusion:

Current (undesired current consumption)

Measured power consumption when car is parked:	

Conclusion:

TASK E: ENGINE TIMING BELT

Car/ Component	Ford Focus 1,6, FYDA/C, 1999. (Engine at a stand)

Task Length	60 min

Task sections / Distribution of points		Maximum score
E1	Health, safety, environment, and labor structure	2,00
E2	Removal of components	6,00
E3	Controls and measurements	2,00
E4	Installing components	16,50
E5	Documentation and preparing for next participant	3,50
	Task Total	30,00 (100%)

Task description:

1. Changing Timing belt (included tensioner and necessary bolts).
2. Check parts in front of engine that are not in the timing belt kit. Do an evaluation of the components and decide if they have to be replaced.
3. Written documentation in English on the work order.

ENGINE – TIMING BELT - CRITERIA

Groupe ID	Assessment Criteria	Max Points	Achieved Points
E1	**Health, safety, environment, and work structure**	**2,00**	
	Approved work clothes and shoes. (no loose ends)	**Must wear!**	
	Used necessary protective equipment.	1,00	
	No damage on car or equipment.	0,50	
	Work structure and system.	0,50	
E2	**Removal of components**	**6,00**	
	Removed spark plugs to ease turning engine.	0,50	
	Turned engine in normal direction of rotation	1,00	
	Did NOT turn engine via camshaft or other sprockets.	1,00	
	Turned crankshaft clockwise until just before TDC (Top Dead Center) on No.1 cylinder.	1,00	
	Removed crankshaft pulley.	0,50	
	Pulled on belt to depress tensioner pulley and insert locking pin. Tool No.tn303-1054.	1,00	
	Removed timing belt.	0,50	
	Removed tensioner.	0,50	
E3	**Check the remaining components**	**2,00**	
	Checked water pump for leakage and bearing for wear.	1,00	
	Checked for other damage or leakage	1,00	
E4	**Installing components**	**16,50**	
	Ensured crankshaft at TDC on No.1 cylinder.	1,00	
	Ensured crankshaft timing pin located correctly.	0,50	
	Hold camshaft sprockets. Use tool No.tn205-072__15-030A_.	1,00	
	Slacken bolt of each camshaft sprocket . Tap each camshaft sprocket gently to loosen it from taper.	0,50	
	Ensured camshaft sprockets can turn freely without tilting.	0,50	
	Fitted setting bar to rear of camshafts.	1,00	
	Fitted timing belt.	0,50	
	Fitted tensioner pulley. Tighten tensioner bolts. Tightening torque: 20 Nm.	1,00	
	Fitted timing belt lower cover.	0,50	
	Fitted crankshaft pulley.	0,50	

	Tighten crankshaft pulley bolt. Tightening torque: 130Nm (~~40 Nm + 90~~ °). Use new bolt.	1,00	
	Tensioner - type C - 09/2003→: Remove tensioner pulley locking pin.	1,00	
	Hold camshaft sprockets. Use tool No.tn205-072__15-030A_.	0,50	
	Tighten bolt of each camshaft sprocket. Use new bolts. Tightening torque: 60 Nm.	1,00	
	Removed Timing pin.	0,50	
	Removed Setting bar.	0,50	
	Turned crankshaft slowly two turns clockwise until just before TDC on No.1 cylinder.	1,00	
	Inserted crankshaft timing pin.	0,50	
	Turned crankshaft slowly clockwise until it stops against timing pin.	0,50	
	Ensured setting bar can be fitted.	1,00	
	Removed Timing pin.	0,50	
	Removed Setting bar.	0,50	
	Fitted blanking plug and tighten to 20 Nm.	0,50	
	Installed the remaining components in reverse order of removal.	0,50	
E5	**Documentation**	**3,50**	
	Set equipment and workspace back in proper place and condition	0,50	
	Use of documentation (instructions)	0,50	
	Stamped work order with initials or name	1,00	
	Mechanics report listing what was done and if anything else has to be done.	1,50	
	Task Total	**30,00 (100%)**	